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To Thomas Money Esqr.
with kind regards from the Author.

Medical Topography

OF

UPPER CANADA.

BY

JOHN DOUGLAS, 1780-1861

ASSISTANT SURGEON, EIGHTH REGIMENT.

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TO

SIR JAMES M'GRIGOR, K. C. T. S.

DIRECTOR-GENERAL OF THE ARMY MEDICAL DEPARTMENT;
FELLOW OF THE ROYAL SOCIETIES OF LONDON AND EDINBURGH;
OF THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND EDINBURGH;
HONORARY MEMBER OF THE ROYAL COLLEGE OF SURGEONS OF IRELAND;
PHYSICIAN EXTRAORDINARY TO THE PRINCE REGENT, AND DUKE OF YORK, &c. &c. &c.

THE FOLLOWING PAGES

ARE INSCRIBED,

WITH PROFOUND RESPECT,

BY

THE AUTHOR.

MEDICAL TOPOGRAPHY

OF

UPPER CANADA,

&c.

The following observations were partly written during the late war, when in Canada, with my regiment, and partly since my return from that country. They are not intended to throw any new light on the present medical practice of the army, but may, perhaps, with other similar communications already published, relating to the campaigns in the Peninsula, the battle of Waterloo, the expeditions to Walcheren and New Orleans, add a little to the general stock of medical knowledge.

Over those districts of the southern boundaries of Upper Canada, which immediately border upon the United States, the different

regiments that composed the British army, were widely distributed. The troops when ordered to advance on any particular position, or again to retire to their several places of occupation, were harassed by long and fatiguing marches. Under the circumstances of such a service, it was my lot, at one time, to be present with my regiment, and, at another period, to be detached from it, lending my assistance in one place, or having charge of an hospital in another, as the nature or urgency of the duty demanded. On this account, it is not to be expected that I am to produce a tabular report of the number of sick and wounded that occurred after the several actions which were fought in the country, either relating to the various diseases under which they laboured, or to the individual peculiarity of their wounds. Neither can I enumerate their admissions either into the general or temporary hospitals, nor their subsequent discharges from them to the effective force in the field. These statements, so desirable to be known, can be supplied only by

those officers of the staff, who directed the medical department in the country. My paper is, therefore, to be considered as a faithful narrative of all that I have witnessed on service, relating to the sick and wounded of the army in the Upper Province of Canada.

I shall treat,

I. Of the topography of the country.

II. Of the soil and climate.

III. Of the services of the troops.

IV. Of the diseases which prevailed.

V. Of the state of the wounded.

VI. Of the provincial militia, and Indian nations who co-operated with the army.

I. Canada is divided into two provinces; the one named the Upper, and the other the Lower. The former, of which I am now to treat, is partially peopled by men who have resorted thither from the most remote countries. It is bounded on the east by the Lower Province, on the south by the Great Lakes, or inland seas of the country, and on

the west and north, by the trackless and almost unknown territories of different Indian nations. It is situated between lat. 43 and 50, and its boundaries include a vast extent of country. The army being employed along the shores of Lake Erie and Lake Ontario, my observations are to be regarded as applying principally to those districts of the province. What belongs to the topography of the Upper, may, with a very few exceptions, be applied to that of the Lower Province.

The appearances which nature every where presents to the eye in this part of the world, are truly sublime, and would arrest the attention even of an indifferent observer. A peculiar interest is found in the objects of inanimate nature. From the declivities of lofty mountains in the centre of a wide continent, immense rivers and mighty streams descend in various directions to the ocean. There are lakes of great extent, whose shores during winter are covered with ice; and whose deeps in summer reflect all the brightness of a tropical sky. Huge cataracts may be also seen,

whose precipitated waters strike the eye with wonder and astonishment.

This country is impressed, not only with an air of grandeur, but of antiquity. Peopled when it was first known to European nations by various tribes of wandering savages, who had no fixed habitation, and whose traditions were fabulous and obscure, its history is involved in doubt and uncertainty. Here no vestige of a ruin attracts the eye of a traveller. Human art seems never to have been employed to perpetuate the revolutions of the past. Nature is the only record to which he can resort for information: and though the numerous and extensive lakes, which cover so large a portion of the province, appear to afford a proof of its being more recently forsaken by the ocean than other parts of the American continent; yet the venerable aspect of its aged forests, the formation of its rocks, and the distribution of its mountains, favour the belief of a high antiquity *.

* The Stony Mountains in the western boundaries of the province are a continuation of the Cordilleras of the

In many situations the shores of the lakes are level, and covered with trees to the brink of the water; but in other parts they are bold, and terminated by abrupt rocks. Numerous streams descend from the adjacent soil, and, at their confluence with the lakes, large creeks are often formed, overgrown with reeds, and other aquatic plants. Into these creeks smaller streams discharge their water, and give to the surrounding grounds the appearance of a widely diffused marsh. The great lakes* are remarkable on account of their extent and beauty. Lake Superior itself may be compared to a vast sea. It is nearly 1650 miles in circumference; and as it receives upwards of thirty-eight rivers, which descend from the most remote parts of those waste regions which form its boundaries, it seems, as it were, an immense reservoir in the centre of

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Andes. Canada is a granitic country, interspersed with rocks of a calcareous texture. The rocks at the Falls of Niagara are partly of the latter description.

* Lakes Superior, Michigan, Huron, Erie, and Ontario, are thus designated.

the new continent. The waves of the lakes are sometimes thrown into violent agitation by stormy winds; and when hurricanes blow, which is often the case in summer, the fury of their commotion resembles that of the ocean.

All the great lakes are supplied with numerous rivers, many of whose remote sources have not yet been discovered. They are also connected by intervening streams, which flow from the west to the east. Lake Superior and Lake Michigan communicate with Lake Huron; the former by the Straits of St. Mary, and the latter by those of Michillimachinac. By the Straits of Detroit, a commercial passage is opened between Lake Huron and Lake Erie. The river Niagara, which is the last in this chain of communication, descends from Lake Erie to Lake Ontario. From the eastern boundary of the latter lake, the river St. Laurence takes its origin, and shapes its course along the lower and southern boundaries of the province on its way to the ocean. In

some of the lakes there is a diurnal ebbing and flowing of their waters; in others, they rise for a number of years till they reach a certain height, and, in the same space of time, again retire to their former limits*. In many of the smaller lakes they are observed to swell only at particular periods, from the immense torrents which are poured down by the dissolving snows of the desert. No satisfactory account has yet been given of those causes which regulate the rising and recession of these great bodies of water. Some of the lakes, indeed, receive a much greater quantity of water than appears to be discharged by their visible outlets. The exuberant portion of fluid has been supposed by some to be transmitted through the air by evaporation; by others, to be carried off by subterraneous currents. Much yet remains to be known with regard to this interesting country. The ranges of its mountains

* The northern shores of Lake Michigan, and the Straits of Michillimachinac, bear testimony of this phenomenon.

have not been completely ascertained: the history of its mineralogy is at best imperfect.

In different parts of the country there are numerous marks of elementary commotion. In many exposed situations, large trees have been torn up, and levelled with the ground, by the impetuous fury of the equinoctial winds, whence an extensive prospect often opens around, of an immense lake whose shores alternately recede and project to the view, and whose deeps encircle an infinite number of little islands. Various flocks of wild birds may be also seen to wing through the sky their undisturbed flight. Thus, while a traveller advances on his journey, he is forcibly impressed with the general stillness of nature, and the awful silence of surrounding solitude!

In other tracts of the province, there are still greater marks of destruction and decay. Great portions of the forest have been blighted and split to pieces by fires, rocks removed from their deep beds, and the bowels of the earth exploded to an incredible distance.

Here, too, are traces of volcanic eruption*. Mountains have been separated from their primitive formation, and the face of nature furrowed with many rough and irregular excavations. Such appearances as these soon become familiar to the eye; and, from their frequent representation, they at last lose their novelty and interest.

In many parts of the province there are wide plains, as yet uninhabited save by a few settlers, who have come thither with their families, and have cleared small portions of ground adjoining their dwellings. The fostering hand of a liberal government has given its support to the infant exertions of the more recent settlers. To some, provisions have been issued to subsist them through the winter. To others, implements of husbandry have been supplied, to facilitate the cultivation of their lands. But, in traversing a country in many parts so wild and desolate, and ob-

* See Volney's View of the United States.

serving, scattered over its surface, a number of families separated from each other, and secluded from civilized society, the mind is irresistibly prompted to feel for a condition of life so forlorn and deserted. Here, man may often be seen verging to maturity untutored, and estranged from all the refinements of intellectual pleasure.

The settlers thus enclosed by thick woods, are occupied chiefly in the laborious concerns of husbandry. Though cut off from the advantages of civilized life, they have other pleasures within their reach. When they remember with regret their distant friends, they are solaced by the more immediate endearments of their families. They rejoice in the prospect of those fields which are made rich by their industry. They love their homes, because they are the abode of peace and independence. Those events which are related to their own state of life, seem alone worthy of their notice. The tumults of contending nations, or the factions of a distant state, when casually made known to them, are listened to

with few emotions of interest. In the populous districts of the country, where the houses are not widely separated from each other, the families of the settlers often meet together, and pass the winter nights in song, in dance, and revelry. The old and young romp promiscuously in the dance, and all is let loose to mirth and festivity. Striplings are seen in winter tracking the wild deer in the woods over the new-fallen snow, or with heart-felt joy carrying their booty homewards on their shoulders. How often have I listened, on such occasions, to the father relating the daring exploits of his son, how, when placed in the extremity of danger, he has encountered and overcome the savage wolf of the forest! The *canoes* in which they embark in summer, afford them sport and useful recreation. When the weather is inviting, they explore the winding course of their navigable rivers, or shape their way at pleasure through the lakes to visit those little isles which are seen rising in the deep before them.

The habitual tranquillity which the settlers

had long enjoyed, was much interrupted by the proclamation of war. Fathers, and sons, summoned to arms in defence of the province, renounced for a season their social relations. From the moment of military conscription the cultivation of their lands was in a great measure neglected. While hostilities were carrying on, their houses were at times pillaged and burnt down by the rapacious cruelty of the enemy. Their fences and orchards were destroyed; their fields were laid desolate. Mothers, with their children trembling in their arms, were forced to fly under night for shelter into the woods, when turning round, they beheld from afar the smoke ascending from their "smouldering" dwellings*. Some had to mourn for their nearest relatives who had fallen in battle. To such the destruction of property, with the kindred feelings of nature, harrowed up by death, dispelled for a short time their hopes of future security.

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* The village of Newark was burnt down by the enemy in the winter of 1813.

The population of Upper Canada has of late years been considerably augmented; and there still is, from other remote countries, an annual influx of strangers. Since the earlier settlers came thither, the indigenous inhabitants have been observed to undergo a gradual diminution; and of those numerous nations who once peopled the present cultivated tracts of the country, not many are at present to be found.

The rude physiognomy of nature is now softening by degrees to the labours of industry. Villages are seen rising in different parts of the province, and their enclosures, running backwards into the woods, give to the neighbourhood which they surround, a considerable degree of order and regularity. A prospect so pleasing to contemplate, in contrast with a scene of solitude and desolation, naturally leads the mind to anticipate the future grandeur of this majestic country, when an increase of population shall cover its surface, and when those bounties, which nature at present scatters so profusely

around, shall not pass unseen nor unenjoyed.

The principal towns in Upper Canada are built along the shores of Lake Ontario, and on the banks of those navigable rivers which are best suited to the advantages of commerce. The length of this lake from east to west is 180 miles: its breadth is much varied on account of the numerous indentations on its shores. Settlements adapted to commercial intercourse prove often unhealthy to their inhabitants. Placed as they generally are on the banks of oozy streams and stagnating rivers; in certain seasons of the year, they contribute materially to the production of sickness.

York, the seat of government, and capital of the province, is built on a level plain, along the northern bank of an extensive bay, which communicates on its west side with the lake. This bay is long and narrow, and fed by many streams from the contiguous soil, which in summer supply its waste of evaporation. It is navigable to vessels of consider-

able burden; and its shores in many parts are overgrown with rushes. Those winds which at times agitate the surface of the lake, seldom or never disturb its stagnant waters. The site which the town occupies appears to have been once a deep meadow, interspersed with pools of water. Some spots of ground which border upon the town are as yet in a state of nature. Even those fields which have been cultivated, are not sufficiently intersected with drains to carry off the collections of water, which, in the rainy season of the year, often inundate the soil. The inhabitants of the town do not exceed six hundred, a number extremely small when contrasted with the whole population of the province*. The town on its west side is defended by a fort, which is erected on a dry and level spot of ground. Here was established the general hospital, in rear of the army, to which the sick and wounded were

* The number of the inhabitants of the province, with the late increase by immigration, may be estimated at 105,000.

conducted as necessity or contingency required. In sickly seasons the inhabitants of York are liable to be attacked by intermittent fever.

Kingston, which is the second town in the province, is larger than York, and contains a much greater number of inhabitants. It is placed on a gentle slope at the north-eastern extremity of the lake, near the source of the river St. Lawrence. The situation of this town is certainly more healthy than that of York, but its inhabitants are by no means exempted from sickness. On its western side, the shores of the lake are indented with deep creeks and retiring bays, whose banks in summer put forth a rank and luxuriant vegetation. At this place the ships of war were equipped for the service of the lake. The town is beset with *picquetting*, and a regiment with other detachments generally composed the garrison, to defend the works in case of an assault from the enemy.

On the southern and western boundary

of the lake stand Fort George and Fort Niagara, separated from each other by the river Niagara, which flows in a north-easterly direction from Lake Erie to Lake Ontario, dividing this part of the country from the United States. These forts being erected on elevated situations, command an extensive prospect of the neighbouring grounds, which are almost divested of their forest. Fort Messissaugo, which is of recent construction, is built at a little distance from Fort George, and on the same side of the river, its position being also dry and elevated.

Lake Erie is thirty-two miles distant from Lake Ontario. Chippawa, and the Falls of Niagara, are placed in the middle distance between these two lakes, and on the northern bank of the river. The intervening country is rich and fertile, and in many parts verging to a high state of cultivation.

The district of Chippawa is flat and marshy, and abounds in summer with noxious effluvia. At this place the river Chip-

pawa, which runs through a level and woody part of the country, appears dead and motionless in its channel, on account of the river Niagara crossing its mouth, so as to impede the exit of its water. For miles above the confluence of these two rivers, the Chippawa overflows and recedes from its banks at very irregular intervals, owing to the greater or less quantity of water brought from Lake Erie by the river Niagara, which accordingly offers to its passage a smaller or more formidable obstruction. Neither the heavy torrents of rain, which are observed to fall in this district of the province, nor the vast quantity of water produced by the melting of the snow and ice, seem to have any influence on the flowing and recession of these two streams. This phenomenon may be referred to the operations of another cause; and it probably depends on the return of those inconstant winds, which impress and propel the waters of Lake Erie to their eastern confines, where, pent up between two nearly approximating shores, they

are forced in accumulated quantity through the deep declining bed of the river Niagara. Accordingly, the village of Chippawa is placed in an unhealthy situation, and, though a military position both in time of war and of peace, it ought never to be garrisoned by troops except in cases of the most urgent necessity.

Fort Erie is erected on the north-eastern boundary of Lake Erie, near the egress of the river Niagara. This part of the country is but imperfectly cleared of wood, and little seems to have been done with regard to cultivation. The district is unhealthy and thinly inhabited. The tract of land which stretches from Chippawa to Fort Erie, is in many parts deep and marshy, and divided by narrow creeks, the swelling and recession of whose waters are also dependent on the increased or diminished size of the river Niagara. It is, therefore, not to be wondered at, that settlers in this line of territory are at times indisposed by sickness.

The Niagara frontier, extending along

the northern bank of the river Niagara, as far as the village of Chippawa, exhibits a more improved state of cultivation than any other part of the province. The scene is diversified by valleys and mountains, and by streams of water which in summer are refreshing to the sight. The woods are cleared; the fields are enclosed; the frontier is well peopled. But this beautiful part of the province was laid desolate by the enemy. The numerous wooden villages which were seen rising in succession along its border, no more charm the ear with the noise of their population. Those spots of ground upon which they stood, are now pointed out by the destruction of their fences, and the residue of a few ashes.

The western shores of Lake Ontario are narrow and confined, and sinuated by long bays, which run deviously into the woods. On the northern side there is a gradual ascent of the land from the shore, till the eye is arrested at a distance by rudely projecting hills, overshadowed with

forests. Here, the mountains of Burlington, a military position of considerable strength, may be seen towering amid the clouds, and overlooking the neighbouring wilderness. These mountains, which are almost inaccessible to an approaching enemy, were reserved as a suitable place of retreat from the Niagara frontier in the event of a discomfiture. During the war they were constantly defended by a regiment. Their summits abound with morass, and in autumn are almost perpetually obscured by thick clouds. The western limits of the lake are but partially settled, and withal very unhealthy.

In the southern and eastern boundaries of the province, Cornwall and Fort Wellington are the only military positions deserving of attention. They are placed at a considerable distance from each other, on the northern bank of the river St. Lawrence, and command the farther shore and the navigation of the stream. Each is able to accommodate a battalion of 1000 men. The neighbouring fields are partly stripped of

their woods, and partly in a state of nature, and are, like many other situations, softening by degrees to the operations of husbandry.

Fort Amherstburgh and Fort St. Joseph may be considered as posts valuable to commercial undertakings; the one being situated between Lake Erie and Lake Huron, and the other being erected on a small island in the western part of the latter lake.

Besides these military positions, of which I have given only a summary description, there are yet others of an inferior importance, which are placed in the interior of the country, and far removed beyond the limits of colonial intercourse. The remoteness of their situations, and the dangers and fatigues to which men are exposed when conducted thither, might seem interesting to be known: but such an account would be foreign to the original import of this communication.

II. The soil of Upper Canada is extremely fertile, and yields plentifully to the efforts

of husbandry. It is composed of decayed vegetable matter, and varies in depth in different situations. When it is dug up, a stratum of cold clay is found below it. The soil is often shallow on the declivities of mountains; but in plains or valleys, which extend along the banks of rivers, it is found to measure from three to five feet in thickness. Those districts which are at present cultivated, afford a willing and an abundant produce; but the hand of industry, from those difficulties which always attend the settlement of a new colony, has as yet made very trivial and partial improvements. The cultivated spots of ground, indeed, when compared with the waste lands by which they are bounded, seem to resemble those little islands which, in the extended lakes of the country, are seen widely scattered over the surfaee of the water.

The climate of the province forms none of its least peculiarities. It is much diversified from a variety of causes in different parts of the cultivated districts: these are,

the peculiarities of soil and local circumstances, the difference of latitude, and the remote ascent of the plains and mountains from the level of the ocean. The climate of a country is best exemplified in the revolutions of its seasons: I shall therefore give a description of each season, in its regular order of succession.

The spring is often wet and cloudy, and attended with easterly winds. The shores of the lakes being now loosened by the resolving influence of the season, have their deeps covered with shoals of ice, broken into pieces by the violence of the winds. The vast quantity carried down by the different rivers of the country, is truly astonishing. Their deep and rapid currents are often filled for the space of ten days; nor is that period, when the winter has been more severe than usual, adequate for its passage. Those beds of undissolved ice and snow, which remain for a long time in the northern regions of the province, have a powerful effect in retarding the progress of vegetation. In April

the spring comes forth in all its beauty. Extensive pools of water, formed by the melting of the snow and ice, deluge the plains in every direction; and remain for a considerable space of time, till the rays of the sun have sufficient power to complete their evaporation. The heat soon becomes oppressive. The day and night evince remarkable extremes of heat and cold, the temperature of the one being elevated by the rays of a powerful sun, and that of the other greatly depressed by the vast quantities of snow and ice which are gradually passing into solution.

The medium heat of the summer, along the southern boundaries of the province, is nearly the same as that of a tropical country. The cultivated spots of land, enclosed by lofty forests, and in many parts by extended mountains, are now exposed to the direct influence of a burning sun, while those breezes are thus intercepted in their course which might otherwise mitigate the fervours of the season. The great evaporation which

is daily going on, has a surprising effect on the general aspect of nature. The soil becomes drier and more compact, and a beautiful vegetation clothes those plains which were lately sheeted over with water. But when the day is sultry, and the earth is much heated by the sun, an offensive odour is at times evolved from the surface of the ground. In no country does nature, indeed, appear to be more lavish of existence. The woods abound with musquitoes: the earth swarms with innumerable tribes of insects; and the loose vegetable mould, when exposed to view, exhibits many forms of organized life, not only passing into being, but undergoing a putrescent revolution. The sun, thus operating on a humid soil, and completing the decomposition of so great a mass of organized matter, tends to the production of those diseases by which men, whose constitutions have not been assimilated to the climate, are always liable to suffer. It is truly remarkable, that the insalubrity of the air, in all warm countries, should be

accompanied with an unusual fertility of the soil; or, in other words, that those causes which promote the rapid growth of vegetation, should generate in man the seeds of sickness. The drought of an ardent summer has little effect in checking the progress of vegetation; for the daily evaporation from the earth is succeeded every night by heavy dews, which cherish and refresh the face of the country. Hence, in cultivated situations, the fruits of the earth are produced in abundance, and are early hastened to maturity and perfection. When the winds blow from the south, or equinoctial regions, they are generally accompanied with a sultry state of the air, and, sometimes, with thunder and lightning, succeeded by heavy showers of rain. When they proceed from the east, the air is often thick and hazy. In summer they seldom blow from the north. When they come from the north-western boundaries of the province, they are always cool and invigorating to the constitution.

Autumn is more pleasant than any other

season. The heat of the sun becomes gradually more temperate. August, however, is at times more sultry than any of the summer months; and the more elevated the temperature of the day, the more reduced is the subsequent coldness of the night. The evenings now feel chilly, and the dews fall in great abundance, so as to wet the clothes of those who travel under night. Marshes, solely from the depositions of dew, become more and more filled with water. In places where no rain has fallen, pools of water are often to be found. The decline of this season is always attended with heavy fogs, which give to every evening and morning a considerable degree of opacity. This mistiness of the air must be referred to the sudden condensation of those vapours which had been exhaled by the sun. So rapid is the formation of the fog, that in the evening, when the sun has withdrawn his beams, it appears to be instantly precipitated from the atmosphere; and every hill, mountain, and valley, is enveloped in a general cloud.

During the day, the sky resumes its usual transparency. When the equinox arrives with attending winds, this state of the weather shortly disappears. Afterwards, the rainy season sets in, and the country is deluged with rain till the beginning of December. The heavy showers which fall from the clouds during this period, are almost incredible. The ditches are filled with water, and the low grounds are inundated by numerous streams which come from the mountains. Military operations at this time are attended with many difficulties, not only from the inclemency of the weather, but from the general wetness of the soil.

Winter commences at uncertain periods in different parts of the province, owing to the variations of latitude and situation, and to the contrary states of agricultural improvement. In the eastern parts of the country, the snow falls often in the beginning of December; but in the more southern districts, it is much later than that period. In the northern and western boundaries of the

province, there is almost a perpetual winter, the earth being frozen to a great depth throughout every season of the year. There, nature scarcely revives at the return of spring. The decrepit appearance of the forest evinces the sterility of the climate. The waste grounds, intersected with rivers, and partially covered with lakes and marshes, are almost perpetually swept by cold icy winds.

In many parts of the country, when the winds blow from the north or north-west, they are extremely cold and piercing, and always bring with them a severe frost. The trees of the forest bear marks of the prevailing influence of these winds. In many situations their branches incline towards the east, and their trunks are covered with a stronger coating of bark on their northern, than on their southern surface. When the winds veer much from these directions, the snow and ice often undergo a partial resolution. The quantity of snow which falls in the northern, is much greater than in the southern regions of the province. Its depth

on the surface of the earth, when not drifted by the winds, is therefore influenced by the degrees of latitude. When the surface of the snow has been congealed by the frost, it proves very serviceable for the passage of *sleighs* *, by which means a communication is kept up between distant parts of the country. While the frost continues, the air is always pure and salubrious, and the sky is remarkably serene. It often happens, that the winter passes away without much frost; but when this is the case, the moist state of the atmosphere renders the season extremely unpleasant. Accordingly, the medium temperature of the air varies considerably in different winters. The thermometer often indicates as great a reduction of heat as is met with in any country.

The winters of Upper Canada are now less severe than at a former period, and also of much shorter duration. It has been observed, that the severity of the cold has de-

* Sledges.

creased in proportion as the soil has been cleared of its wood; but as the cultivated grounds are very inconsiderable, when compared with the waste lands of the province, we are not thence to suppose, that this amelioration of the climate is dependant solely on the progressive state of agricultural improvement. A variety of causes no doubt exist in the economy of nature, which tend to promote this important purpose. As associated with these causes, the visible revolutions which are taking place in the interior of the province, are not to be overlooked. Some of the small lakes have lost so great a portion of their water, that they appear to be slowly passing into a state of desiccation. Others are gradually filling up with the vast quantities of soil and gravel, which are carried down from elevated situations by their numerous rivers. Extensive marshes are now found in those places which were formerly occupied by lakes. These marshes again are undergoing transformation. From the accumulated mass of their decayed pro-

ductions, a new soil, already covered with trees, is emerging from the surface of the water. Even the rivers and great lakes are supposed by some to be in a state of progressive diminution. Of these, however, it is difficult to judge, on account of the periodical movement of their waters. Should these physical revolutions have no share in effecting an alteration in the climate, they are yet of material importance in a geological point of view. The naturalist may trace the incipient configuration of a soil, which in time, under the hand of cultivation, may extend the territorial resources of an agricultural people.

III. The services of the army in Upper Canada were arduous and severe. So great was the scarcity of men, both at the commencement, and during the continuance of the war, that no sooner had a regiment arrived at Quebec, than it was immediately ordered to proceed on its march to the Upper Province. The route was long and tedious,

the fatigues great; and many difficulties were to be overcome. This line of march, from the point of debarkation to the Niagara frontier, where hostilities were carried on, includes a distance of nearly 550 miles. The road is cut through the woods, and runs along the banks of the river St. Lawrence, and the northern side of Lake Ontario, varying in its course with the undulations of the shore. It is often interrupted by deep bays, and also by numerous tributary streams which discharge their water into the river St. Lawrence. In many places where the ground is low and marshy, large trees are cut down, and laid crosswise, to facilitate the passage. When a march was undertaken in spring, or in autumn, the miry state of the roads presented many obstructions. Nor were the oppressive heats of summer, superadded to the fatigues of long and forced marches, less dispiriting to the soldier. When the passage was rendered tedious from the wetness of roads, the

troops were generally conveyed to the Upper Province in *batteaux* *, from which they were often obliged to disembark when they had to encounter the rapids of the river. The hauling and poleing of these vessels against the stream, was attended with much labour. The clothes of the men employed on this duty were almost constantly wet. During night their accommodations were wretched. They slept cold and comfortless in the barns and out-houses of the settlers, which are widely scattered along the banks of the river. Sometimes, when overtaken by night, a fire was kindled in the woods, around which they stretched themselves till morning.

But winter, with its attending storms, offered greater impediments to a march than any other season. Vehicles to forward the baggage could not always be procured. For successive days the march was at times obstructed by the falling of snow; and the drifted state of this in the woods rendered it hazard-

* Small flat bottomed boats.

ous to prosecute the journey. The faces of the men were often frost-bitten, when much exposed to the north wind. Sometimes, indeed, the tear was no sooner secreted from the eye, than it congealed into an icicle upon the eyelashes, so as to restrain their motion. Many of the wooden bridges which conducted across the streams had been burnt down by the enemy. The ice not being of sufficient thickness to support the men and baggage, delay was thus rendered unavoidable. But more dejecting than all, such obstructions as these were sometimes accompanied with privation. When the rations of the men were expended, the settlers could afford but little from their winter's stock of provisions. Thus want, in addition to the inclemency of winter, and the numerous impediments of a long march, increased the burden of general calamity. The night, too, proved more uncomfortable than the day. Though the men were stretched before the fire, the intenseness of the cold was severely felt. The toils of the day were not always followed by the refection

of sleep. Its return seemed to be prevented by a certain degree of cold, and a deficiency of covering. The silence of the night was disturbed by the howlings of savage wolves, that prowled around the cottages. Nor was the ear less impressed by the loud winds in the forest, and the incessant noise of an impetuous river. The road at times emerging from the woods, ran for a considerable distance along the edge of the river. Huge sheets of ice were then seen piled to an amazing height along the rocky margin of the stream. The accumulated mass, obtruding from the shore, appeared to alter the direction of the current. Rivulets descending from abrupt precipices, seemed from afar, frozen to the eye. The grandeur of the scene was heightened by a variety of all those sublime objects which can engage the mind amid the general wildness of nature. Infants at their mothers' breasts supported with impunity the severity of winter.

When the shores of the lakes were sufficiently frozen, so as to support the men and

baggage, the day's march was completed with facility. Besides, it could be shortened or prolonged according to circumstances, when a choice of accommodation could frequently be obtained; yet the early completion of a route, attended with so many unavoidable obstructions, was always to be wished. Though other difficulties were to be surmounted in the field, their anticipation had as yet no power to sully the fondness of expectation.

In the prosecution of active operations, the services of the men were truly important. Physical obstructions were more difficult to be overcome than those opposed to them by the designs of the enemy. The centre of a wide forest was sometimes the theatre, where bravery was to be shown, or victory to be won. The inequalities of the ground, the deep and extended marshes, and, above all, the thickness of the wood, rendered it impossible to keep the men in a solid body when advancing into action. The mode of warfare, too, was new to the greater part of the British troops. By being separated into small parties,

an advancing column had its effective force considerably impaired. Its power, thus weakened by the subdivisions it had made, could not be concentrated again, to decide the fate of the day by the point of the bayonet. The artillery also had much to contend with. Their guns, locked, from their excessive weight, in the ground, could not always be brought into action.

At the commencement of the war, the country was naked and defenceless to the inroads of the enemy. Forts and batteries were erected, and breastworks were thrown up. In the construction of these, the troops were employed; consequently their duty, both in defensive and offensive operations, was attended with many hardships. Those actions which were fought in winter, were generally partial; but those in summer were more serious and bloody. Incomplete forts, blockhouses, and temporary huts, formed the chief covering for the troops. Both in winter and summer the army was kept on the alert by the contiguity of the enemy. Numerous sentries

surrounded every fortress by night. By means of advanced *picquets*, a long chain of communication was maintained in the woods; and every position which the troops occupied was guarded in a similar manner. Thus the discharge of an important duty never failed to give a stimulus to the mind of the soldier: his energy was increased when he had difficulties to encounter; his courage was renewed and strengthened when he had dangers to oppose; and his patience and perseverance were never overcome under all the fatigues of his long retroceding and counter marches.

IV. We have now given a short view of the general aspect of the country, and of the principal settlements, and different military positions, as far as they are worthy of our attention. We have also considered the nature of the soil and of the climate, and the arduous services which the troops had to execute. From what has been said, some idea may already be formed of the nature of those diseases which obtained in the army.

In every remote region, there are many objects to engage the attention of a medical observer. The face of nature is new and interesting. The vegetable kingdom displays around him a number of her productions, whose history he had known only by description. Amid the general variety presented to view, he feels an inward pleasure in recognising some of those plants, which are also the offspring of his own native soil. His mind is no less interested with the peculiarities of the climate, than with the different forms of those diseases which are prevalent in the country.

In those changes which are every where conspicuous on the surface of the earth, the sun is to be regarded as an important agent. His heat and light promote vegetation. Besides, the remains of all vegetable and animal substances, draw, not only their putridity, but their infectious power, from the action of his beams.

There is often in the revolution of each season, a wide field laid open to medical pursuits. In unhealthy situations, a minute re-

gard should be paid to every local circumstance. The alterations of atmospheric temperature should always be examined, and the small or copious depositions of dew, with the deficient or superabundant falls of rain, ought to be taken into consideration. Those winds, too, ever varying, not only in their direction, but in force, frequency, and in the period of their duration, should not escape observation; for in all countries they have been found connected with the different states of health and of sickness: and though those causes which tend to the partial or general production of disease, lie hid from our perception, yet amid all the doubt and uncertainty which accompany our investigations, we are still able to trace an evident analogy between each season of the year and its attending diseases. In this point of view I shall treat of those diseases, which, as far as my observations extend, were most prevalent in the army during its exposure on service to all the vicissitudes of the different seasons. Commencing with the diseases which made their appearance in spring,

those in the other seasons will follow in their relative succession. I may, however, observe, that there are few situations in Upper Canada which do not abound with marsh-miasmata, and in which remitting and intermitting fevers are not to be found; and that these fevers are endemic to all those districts of the province, which I have mentioned as being visited by *sickness*, or to which I have given the appellation *unhealthy*.

In spring, catarrh and pneumonia were of frequent occurrence. Catarrh seemed to depend on the changeableness of the weather; pneumonia, on the great and sudden transitions of temperature. The former, indeed, sometimes preceded an attack of the latter disease. The soldier, either when engaged in the services of the field, or in the duty of a garrison, was alike subject to an attack of pneumonia. It was produced in some by exposure to cold on picquet; in others, by acts of intemperance, and sleeping out of doors under night. It sometimes happened that those individuals were seized with this disease, who, in order

to void their urine, were accustomed to leave, for a short period, their crowded and over-heated barrack-rooms by night. Men who were transported in *batteaux* from one part of the country to another, and whose clothes were constantly wet at the oars, suffered severely from its attacks.

In different patients the symptoms of pneumonia were remarkably varied. In some, the breathing was anxious, the pulse quick and chorded, the cough troublesome, the countenance flushed, the pain of chest constant and severe, and inspiration performed with much difficulty. In others, the breathing was laborious and oppressed, the cough urgent, the expectoration at first dry, but afterwards bloody and mucous, the pulse full and throbbing, and the face swoln, or of a purple colour. A dull pain was referred to the region of the chest, and respiration could not well be performed except in an erect posture. There was at times a disposition to profuse sweating. Catarrh often accompanied this form of pneu-

monia. In some, however, these two forms of the disease were evidently mixed.

But there were men attacked with pneumonia, whose symptoms assumed a very unusual appearance. In them the marks indicative of the disease, were very obscure. The morbid action of the pulmonary vessels seemed to be smothered. The pulse was but little accelerated. In a few instances it was low and depressed. The heat of the skin was not much beyond its natural standard. Their painful sensations were not always referred to the seat of the affection, and they complained, as in many states of fever, of debility, and of listlessness to motion. By the abstraction of blood the character of the disease was soon made manifest.

Sir James Macgrigor, in his account of the diseases which prevailed in the Peninsular army, has delineated the peculiar features of this form of the complaint. "Pneumonia," he observes, "prevails more among soldiers than in civil life; and well defined as this dis-

ease is by nosologists, it requires the experienced military practitioner to detect it. It frequently happens, that the patient, so far from exhibiting the well-known diagnostics, appears to labour under every symptom of oppression and debility. Until strictly questioned, he complains of nothing so little as his breast. The true nature of the disease is not detected without the most experienced and scrupulous examination; nor does it show itself in its natural colours, till the functions of the oppressed and congested lungs are in some degree restored by abstraction of blood. Without this relief it cannot show itself; for re-action under such circumstances cannot take place; and the practitioner is led into the fatal error of treating the disease as low fever *."

To combat the urgency of the symptoms in each form of the disease, it was necessary to carry depletion to a very great extent. When the patient had not been bled within

* See Medico-chirurgical Transactions, vol. vi. page 438.

the first thirty-six hours after his attack, the disease was apt to terminate fatally by general effusion into the substance of the lungs. The state of the pulse was not always regarded as an infallible guide for the use of the lancet. The appearances of the blood, and the pain attendant on inspiration, alone indicated blood-letting. Even in debilitated constitutions, the morbid action of inflammation ran so high, that it was difficult to subdue the disease by the most plentiful depletion. When effusion supervened, it was accompanied with an oppressed pulse, sometimes with cold perspirations on the breast and temples, with delirium, and a propensity to sleep. In those men who laboured under chronic diseases, congestion and effusion were sometimes consequent to severe attacks of pneumonia. In them the expectoration of blood gave indication of an existing plethora in the pulmonary system. It afforded a proof, that the relaxed and distended blood-vessels were giving way to the action of inflammation; and, more than all, as a partial but salutary effort of

nature, it pointed out the necessity of copious blood-letting.

The young soldier being often addicted to intemperance, his constitutional symptoms of inflammation are generally of a violent kind. Few diseases, indeed, require a more prompt and decisive treatment than pneumonia. Before congestion and effusion have taken place in important organs, the abstraction of blood from the patient should be immediate and copious. In pneumonia, sparing and untimely bleedings endanger life. Even should a recovery follow, they expose the patient to preternatural adhesions between the pleuræ. These adhesions may prove the source of much mischief to the soldier. They may restrain the freedom of respiration, and unfit for fatigue; and may at last lay the foundation for pulmonary consumption.

Vital organs which have been the seat of active inflammation, become weakened and impaired in their functions. Moreover, they are prone to relapse into inflammation. Men who have had repeated attacks of pneumonia,

are for the most part affected with a troublesome cough. The exhalant vessels of their lungs seem relaxed. The glands of the trachea and bronchiæ discharge an unusual quantity of mucus. The investing membrane of the air-cells is much irritated in cold weather by the action of the air. Attacks of inflammation are induced, adhesions between the pleuræ become more extensive, the vital functions of the lungs are more and more injured, the cough becomes frequent and urgent, and the patient at last feels breathless upon his accustomed exertions. When he inspires freely he may now be sensible of a tightness in his breast. Even in a state of reposé, the breathing is partially hurried, the pulse is quickened, the cheeks are occasionally flushed, and there is also a burning sensation in the soles of the feet and palms of the hands. The capacity of the chest seems diminished, the head bends forward, the shoulders become pointed, and the patient gradually assumes the phthisical aspect.

Few medical officers have served in the

army, for any length of time, who have not witnessed, in the same constitution, the repeated attacks of pneumonia and its consumptive termination.

It is a remarkable fact, that in the early stage of inflammation, death has never directly followed the abstraction of a large quantity of blood from the human body. The consideration of this circumstance, when it is deemed expedient to have recourse to bloodletting, ought to inspire confidence in the mind of the young practitioner. When the powers of the system have not yet suffered from the constitutional excitement of inflammation, much good may be done by the seasonable employment of the lancet. Dr. Haller has recorded a number of cases in which hæmorrhages have occurred to an alarming extent. He reports one person to have lost twelve pounds of blood by vomiting in one night. He mentions another who discharged, in the same space of time, twenty-two pounds of blood from the lungs. Nor in these two instances were the evacuations of

blood succeeded by death*. Since, then, nature has spontaneously poured out more than three fourths of the circulating mass from the living system, what reason have we to dread a fatal termination from the extensive employment of artificial blood-letting?

Late and untimely bleedings have lessened the reputation of the lancet. When pneumonia has run on for a number of days, without blood-letting being employed to retard its progress, that quantity of blood, requisite to be taken in order to accomplish resolution, at an after-period of the disease may be so great as to endanger the essential principles of life. Under such circumstances, the lancet has been resorted to both by the bold and the timid practitioner. The attempts of the one have been unsuccessful in checking effusion and suppuration; those of the other, though they may have prevented these consequences of the disease, have sometimes led to the fatal supervention of typhoid debility. He who,

* Elementa Physiologiæ, vol. iv. page 45.

on so trying occasions, has been guided by his own solitary judgment, has not felt with indifference, the importance of that responsibility which is so often attached to his professional endeavours. In certain cases of pneumonia, it is, therefore, a difficult matter to decide what quantity of blood may be taken with safety from the system. In determining this point, the most experienced may feel the insufficiency of his knowledge. But though death has in a few instances followed the extensive employment of blood-letting, we are not on that account to supersede its prescription. One thing ought always to be kept in mind, that it is the only remedy within our reach which can afford relief to the patient; and that, should it not complete the resolution of the disease, it may afford a transient mitigation to the most urgent symptoms of inflammation. When blood is to be abstracted, some attention should be paid to the state of the patient's constitution, and to the circumstances in which he is placed; to his habits of life, to the severity of the symptoms, and to

the time which has elapsed since the commencement of the disease. While we attend to the importance of these considerations, and at the same time observe the effects of repeated blood-letting on the symptoms of inflammation, we shall be enabled to form our prognosis with a greater degree of certainty. In the majority of cases, the flowing of the blood is not to be restrained, till it has procured relief to the patient; and this is indicated alone by the absence of pain during the function of inspiration. In short, we are not to desist from the further use of the lancet, till we are enabled to conclude from the deductions of our experience, that we have done all that human interference could have accomplished.

It sometimes happens that men attacked with pneumonia, who appear worn out with previous disease and long service, are not apt to sink under the debilitating effects of plentiful blood-letting. In them, I may remark, the diseased action of inflammation was slow in its progress; and though apparently

overcome by the timely abstraction of blood, it was disposed to renew its invasion. "In weak constitutions," says Mr. Hunter, "the operations of inflammation are backward, notwithstanding the part in which it is seated may, comparatively speaking, possess considerable organization and powers of life." The youngand robust do not always support the loss of blood so well as might be expected. Men in whom the venous plethora is conspicuous, either in the middle or in the more advanced periods of life, are generally well calculated to support the most copious depletion. It must, however, be confessed, that peculiarities of constitution now and then occur, to which these observations are no way applicable. Some patients, indeed, have been so much overcome by fear at the sight of the lancet, that blood could not be obtained from the arm in that quantity sufficient to check the course of inflammation. After all, we may with safety infer, that in cases of pneumonia, when the blood-vessels are roused into a state of unusual excitability, a greater quan-

tity of blood may be taken with less injury from the patient, than in an opposite state of the system.

Neither the cupped appearance of the blood, nor its sizy coat, at all times corresponds to the severity of the symptoms of inflammation. The abstracted blood of one man who died of pneumonia, exhibited little or no siziness on its surface. This, however, is a rare occurrence. There is truth in the assertion, that the marks of inflammation on the surface of the blood are, to a certain extent, modified by the shape and temperature of the vessel, and by the force and magnitude of the stream, as it springs or descends from the arm. In many instances the form of the coagulated mass bears a striking resemblance to the figure of the vessel which contains it. In different cup-fulls taken at the same bleeding, the relative quantity of serum to that of the crassamentum, is often considerably varied. When the constitutional symptoms of pneumonia run high, the serum generally predominates. In this case the coagulated part

has often been observed, firm in its texture, elevated on its margins, and covered in its hollow centre with the buffy crust. The circular border of the crassamentum, when it joins the sizy coat on its external edge, assumes the colour of the arterial circulation, probably owing to its greater exposure at that part to the action of the atmosphere. The coagulated mass, which is of a dark colour on its under surface, either sinks or swims in the serum. This, however, depends on the manner in which the blood is taken from the arm. When the stream is strong, and propelled in a straight line to the cup, the generation of air-bubbles on the surface of the mass, renders it partly supernatant. The tenacious fibrine, spread over the superior part of the crassamentum, feels tense and elastic to the touch, and not unlike the firm consistence of a muscular membrane. In this state it would appear, that the blood has acquired the property of forming a new bond of union between inflamed parts by an adventitious process of adhesion. The dissolved

appearance of the blood which at times occurs in pneumonia, may seem to dissuade us against the employment of the lancet. This appearance, however, is at last overcome by repeated blood-letting. Coagulation takes place, and the crassamentum becomes coated with its inflammatory covering.

To combat pneumonia in one patient, sixteen pounds of blood were taken from the arm within the space of four days. To overcome the disease in several other men, nearly the same quantity of blood was abstracted. In the greater number of cases, it required the loss of eight or ten pounds of blood to resolve the inflammation. When the blood flowed from the arm, it was always a desirable object to make the patient fall into syncope, and to keep him in that state for a considerable time. The temporary check which was thus given to the impetus of the circulation, was often followed by the happiest effects. When large quantities of blood had been taken, it was found necessary to administer small portions of wine upon the cessa-

tion of inflammation. The warm bath, when it could be procured, was an excellent assistant to blood-letting. When men were seized with pneumonia on a march, or when navigating the rivers or lakes, in uncovered boats, neither antimonials, blisters, nor purgatives could be employed with advantage. On such occasions, the lancet was the only resort of the surgeon. Digitalis, when circumstances permitted its use, had a fair and impartial trial. How much soever its antiphlogistic virtues may have been extolled by certain practitioners, no good effects resulted from its administration in pneumonia.

By the dissection of one individual who died on the fourteenth day of the disease, a large vomica was discovered in the right lung, and also an abscess in the substance of the liver. This patient had suffered at a former period from intermittent fever, and his pneumonic symptoms were combined with those of hepatitis. In another who died on the third day after his admission into hospital, there were observed, general effusion into the air-

cells of the lungs, adhesions between the pleura, and the substance of the lungs interspersed with numerous tubercles. This man, before the supervention of inflammation, had evident symptoms of an incipient phthisis. Other dissections of the dead presented nothing new or uncommon.

Acute rheumatism, like pneumonia, derived its origin from the sudden transitions of heat and cold. It was met with at the close of autumn, sometimes in winter, but most frequently in spring. It appeared also to be connected with severe service as a remote and predisposing cause; for it was more prevalent after the cessation of hostilities, than during the continuance of the war. It interrupted, more than any other disease, the enjoyment of that repose in which the soldier expected to participate after having undergone so many privations. It seized those men most severely, who had been prisoners at Pittsburgh, in the United States, and who, in order to join their battalions in Canada, had immediately after

the ratification of peace, performed long and fatiguing marches.

This disease was usually accompanied with a smart fever. The pulse was hard, the thirst great, and the bowels constipated. The blood drawn exhibited marks of inflammation. The disease was apt to terminate in its chronic form. In some patients, affections of the liver, and a general yellowness of the skin, were attendant on the complaint. After the inflammatory symptoms had yielded to the usual mode of treatment, the lower extremities often became œdematous. Those cases of the disease, combined with obstructed or diseased viscera, were much benefited by mercurial salivation. Rheumatic convalescents had generally a sallow complexion, and complained long afterwards of debility in their limbs.

Chronic rheumatism, not preceded by the acute, seized those parts of the body which were exposed to the impressions of the weather. The ankles and feet, the wrists, the temples, and roots of the teeth, were the

principal seats of this affection. Exposure to rain and cold always aggravated the complaint. In one man who suffered much from the pain in his jaws and temples, the molares became loose, and dropped out from their sockets apparently free from disease.

Vernal intermittent fever appeared in the form of tertians and quotidians. It seized those men who had been the subjects of its attacks, either at an early period of their lives, or during their recent exposure on service. Recruits, whose constitutions were not impaired by fatigue, seldom experienced its invasion. A cold easterly wind, with a hazy state of the air, was sufficient to produce it. The paroxysms of the fever were not obstinate, but generally yielded to the liberal administration of cinchona.

The heat and sultriness of the summer months produced languor and relaxation in the system of the soldier. Many of the situations which the troops occupied, had been deluged with water, and in their neighbourhood were numerous marshes. The miry

shores of the lakes, and the foul banks of many sluggish streams, were often traversed by the troops. Cooling breezes seldom refreshed them on a march. The trees of the forest afforded only a partial protection from the heat of the sun.

Cholera morbus was occasionally met with on a march. It owed its origin in some, to the drinking of unwholesome water in the creeks, and to the eating of unripe fruits. In others it might also have been produced by the changes of temperature; the chilliness of the night, and the subsequent sultriness of the day. This disease I have often witnessed in the West Indies, amongst those men who were employed in marauding excursions in the woods, after those slaves who had forsaken and pillaged the plantations of their masters. In both countries the same causes tended to its production.

When quartered with my regiment in the unhealthy village of Chippawa, during the summer of 1814, intermittent fever became remarkably prevalent in the battalion. With-

in the short space of six weeks, one half of the corps was admitted into hospital, labouring under the disease. Those men who were attacked, had almost all suffered from it on former occasions. The men were restricted from bathing and fishing in the creeks and rivers; for some, when employed in these refreshing exercises, were chilled with the coldness of the water, and again seized with the paroxysms of the fever. The sickness at last became so pressing, that we were under the necessity of evacuating the position, and of retiring to the rear of the army to a more salubrious situation. The type of the fever was the same as in spring, with the exception that it assumed, in a few instances, the form of a double tertian. I never observed in any part of the country the quartan form of this disease.

I shall now give an account of the summer and autumnal remitting fever, as it appeared in Upper Canada *. This disease is termed

* Sir John Pringle remarks, "that the epidemic of autumn and prevailing distemper of this (Zealand), and

the Lake fever by the settlers of the country. It prevailed to a greater extent in the summer and autumn of 1813, than at any other period during the active services of the army in the province. The opinion, I believe, is well founded, that this malady has the same common origin with intermittent fever. In Canada both diseases were found in similar situations, and sometimes alternated with each other in the same constitution. Each obtained more or less in particular districts, from the peculiar influence of those local or general causes which were efficient in its production. From putrid animal and vegetable exhalations, both derive their origin. Such exhalations have often proved noxious to an army, when encamped within the sphere of their malignant influence.

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other marshy countries, is a fever of an intermitting nature, commonly of a tertian form, but of a bad kind, which in the dampest places and worst seasons, appears a double tertian, a remitting, or continued, or even ardent fever; all which, however varying in their appearance, according to the difference of constitution, or other circumstances, yet are of a similar nature."

The attenuated state in which these gaseous emanations exist, is invisible to our perception. Chemical analysis has not yet detected their presence in the atmosphere. Though we may form an idea of their nature as associated with those substances from which we suppose them to be derived, and may almost define those bounds within which their noxious operations are going on; yet our knowledge concerning the manner in which they are applied to the living system, is limited and obscure.

The effect of marsh-miasmata on the human body, is sometimes instantaneous. When marching through an unhealthy tract of the province, I have seen men, who had recently joined the army, suddenly seized with the symptoms of fever. Nausea, lassitude, giddiness, and confused vision, were the precursors of the disease. Others I have seen attacked with difficult respiration, fainting, and immobility of the limbs. Those affections were not, like the former, premonitory of fever; but seemed referable to the scorching heat of the

sun, and, in a few instances, preceded an attack of cholera morbus.

For the most part the human body appears to be insensibly impregnated with marsh-miasmata, and it may be filled with a certain quantity of the poison for a considerable time without producing the symptoms of disease. Under such circumstances, fatigue, the depressing passions, great exposure to cold, or to the heat of the sun, are causes sufficient to call the morbid movements of the system into action. It is well known, that both remittent and intermittent fevers have invaded individuals in places remote from those unhealthy situations in which the seeds of these diseases had been at first generated.

The symptoms of remittent fever were much diversified in different individuals. Many of the men were attacked on night-duty with the symptoms of this disease. Thus, the debility induced by cold and want of sleep, disposed the marsh-miasmata to operate more immediately on the system. Men, too, who were daily employed at the mound,

or in the erection of huts, were seized with the fever. Its attacks were ushered in by cold rigors; but, sometimes, there was little or no sense of chilliness. There were often severe pains in the forehead and eyeballs, in the thighs, back, and posterior part of the neck. The tongue was at first white, but afterwards streaked with yellow in its centre. As the disease advanced, it became parched, foul, and, in bad cases, of a dark colour. Nausea always accompanied the disease, and in some cases a good deal of irritability in the stomach. The bowels were often difficult to move; sometimes they were loose, and the patient complained of tenesmus. In mild cases the thirst was moderate, the heat of the skin not much above the natural standard, and the pulse but little accelerated. In severe cases the countenance was flushed, the heat of the skin great, the pulse often hard and full, and the eye expressive of wildness. The temporal arteries, too, felt throbbing to the touch. The urine, though generally high-coloured, was sometimes of a deep yellow.

Large quantities of bile were passed both by stool and by vomiting. Slight remissions of the fever generally took place every evening and morning. Its exacerbations had, usually, no fixed period of attack. When the fever was ardent, delirium came on at an early period, and often continued throughout the whole course of the disease. In many instances its presence, or absence, depended on the exacerbations and remissions of the fever. In a few patients there were swellings in the submaxillary glands, and hæmorrhages from the mouth and nose. Discharges of blood were favourable when they occurred early in the disease; but in advanced stages they were often the forerunners of death. An eruption about the mouth on the third day, at times gave indication of a propitious crisis. A fatal termination seldom happened before the eleventh day of the disease. In some men, before death, the skin assumed a yellow appearance. In a number of instances, it terminated in an obstinate intermittent fever.

This fever, like the bilious remittent of the

West Indies, often resolved itself favourably on the third day after its attack. A few sporadic cases occurred which had a striking resemblance to that fever. They differed, however, from it in not being accompanied with the black vomit, and in being less prone to terminate fatally. How evident soever the similitude may be which exists between these two fevers, it would certainly tend to much tedious and fruitless disputation, should I attempt to prove their identity. They are, without doubt, the offspring of the same causes, and are found co-existent only in the elevated ranges of atmospheric temperature. The features and symptoms of remittent fever have been observed to differ much in their general expression and in their degree of severity. Accordingly, this fever has derived its present numerous appellations from the variety of character which it has assumed in different countries. But in whatever region it presents itself, as modified either by the peculiarities of constitution, or by the quantity and concentrated state of the poison, as it

is received into the system; we may observe in all its forms a corresponding resemblance, and an almost constant tendency to sanguineous congestion in the most important viscera of the body.

The treatment of this fever on its first attack, consisted chiefly in depletion. When the pulse was hard, the lancet was used freely. The abstracted blood at times exhibited marks of inflammation. When there was great determination to the head, much benefit was obtained by the opening of the temporal artery. In those men in whom the irritability of the stomach was not great, emetics proved very useful. Calomel and jalap were the principal purgatives which were administered. When delirium or coma supervened, blisters were applied to the head, and calomel, combined with James's powder, was given in such quantities as might affect the mouth. As a means of promoting salivation, mercurial ointment was also rubbed in over the region of the liver. When the heat of the skin was much higher than natural, the cold affu-

sion was sometimes effectual in producing a remission of the fever. On the appearance of a remission the bark was administered.

My friend Mr. Griffith, of the Royals, who served with his regiment in Upper Canada during the period of hostility, has favoured me with a letter on the subject of this disease, part of which I shall now take the liberty of transcribing. "No doubt can be entertained," he says, "that the remittent fever of Upper Canada is produced by the putrid effluvia with which the shores of the lakes and the low wet grounds of the country in many parts abound. When the fever prevailed in my regiment, the services of the men were very laborious; for they were employed in strengthening their position, and in throwing up breast-works. Every night parties were sent out on the advance to reconnoitre in the woods. In this manner, exposed at one time to the heat of the sun, and at another to the cold dews of the night, it was not to be expected that the men could remain long free from sickness. Besides, their huts

were built of green wood, covered with live turf, and pervious to every shower that happened to fall. Taking all these things into consideration, we shall not be at a loss to account for the appearance of this fever. The remittent fever of Canada was certainly less violent in its form, and more irregular in its symptoms, than the yellow fever of the West Indies. In a number of cases of the former I ventured to give emetics; but in the latter, you well know, we always reckoned their use extremely hazardous. I bled freely in Canada, but not so plentifully as within the tropics. In the remittent of Canada, the ablution of the body with cold water often brought on a remission, after which the bark was given with advantage. Calomel, however, was the principal remedy; for, when the mouth became affected with that medicine, the patient had, for the most part, a speedy recovery, and was not so liable as others who were treated in a different manner, to be attacked with intermittent fever. It is difficult to assign any reason, why those causes which produced in

some men a tertian or quotidian intermittent, should have produced in others who were placed under similar circumstances, the well-known symptoms of a bilious remitting fever."

Of dysentery I have but little to communicate. The acute form of this disease, which in other countries has often proved distressing to an army, was not much to be dreaded in Upper Canada. In those cases which came under my care the symptoms of inflammation were not very urgent. The remittent and intermittent types of fever were attendant upon the complaint. The tenesmus, though not severe, was sometimes long continued. The fæces were mixed with mucus, and at times with blood. Gentle bleedings, a few purgatives, and attention to diet, generally overcame the complaint. It terminated in the chronic form, in those men whose viscera were enlarged, or in those who were debilitated from frequent attacks of intermittent fever. Dysentery seemed so blended with that disease, that, in a number of instances, it alternated with the paroxysms of the fever.

Chronic dysentery is supposed by some to be connected with a vitiated state of the biliary secretion. The opinion is certainly well founded; for the liver has been observed diseased in a number of patients, who have fallen victims to this form of the complaint. Although it may seem reasonable to refer the deranged action of the bowels to the morbid operations of that organ; yet chronic dysentery appears to me to be connected with other glandular secretions. Mercurial friction, when it is pushed so far as to affect the mouth, almost always suspends the dysenteric symptoms. In this case, would it not be improper to attribute the salutary influence of the mercury to the supposed improved secretion of the bile in the liver? When ptyalism has ceased, do not the bowels again resume their diseased action? But, further;—the motion of a ship has long been supposed by some to counteract the inordinate action of the intestines. Hence a voyage has frequently been prescribed to men labouring under protracted dysenteries. Those cases of the disease which

are annually imported from tropical countries, are always benefited by the sea breezes, and, in a number of instances, undergo a spontaneous cure during the passage. From the increased discharge of urine, which always accompanies the gradual amelioration of the symptoms of the disease on board ship, I have been led to conclude, that not only the perspirable matter from the skin, but the diseased secretion from the intestines, is capable of being translated to the urinary organs, by which means the disordered bowels have at last re-established their healthful operations.

The close of autumn, when the army was in the field, for the most part brought with it an increase of sickness. Remittent fever now ceased to show itself. As the season advanced, intermittent fever became more and more rooted in those men who had suffered from its previous attacks. The cold nights, and foggy state of the air, seemed to incorporate the disease with the constitution. During the autumn of 1814, its consequences were severely felt amongst the troops, when en-

gaged in the siege of Fort Erie. At that period there was a daily increase of sick, and the effective force in the field was at last reduced to one half of its original number. The huts and block-houses constructed before the fort, for the shelter and defence of the men, were then permeable to the heavy rains of the season. No time was allowed to convalescents to repair the waste of disease. When discharged from hospital, they were instantly marched off to participate in the hardships of an urgent service. On their way thither, some might be seen falling down and relapsing into fever. The pressure of duty was always so great, that the exertions of every individual, however feeble, were of material importance in the protection of the country. When a regiment was put in motion, the debilitated state of the men could not escape notice. Numbers, unable to proceed, straggled, or lingered in the rear. It was not the love of plunder that occasioned the delay of the soldier, but the feeble powers of an exhausted constitution. The deep

and unequal grounds, over which he was called to march, the weight of his accoutrements, which he was scarcely able to support, rendered the journey tedious and insurmountable. In this pitiable condition, it is much to be lamented, that he should so often resort to inebriation, as a temporary retreat from his numerous sufferings.

The only account of the intermittent fever of Upper Canada, with which I am acquainted, is that afforded us by Mr. M'Causland, who was surgeon to my regiment during the former American war. From his communication, it appears that he had been quartered, for a number of years, with his battalion in Fort Niagara. He mentions that tartar emetic, given in the form of pill, was more efficacious than the Peruvian bark in the cure of the intermittent fever. "I am confident," he remarks, "that I speak considerably within bounds when I say, that, from the year 1775 to 1781, this remedy alone has removed three hundred agues*." Future experience,

* See Medical Commentaries, vol. viii. p. 242.

however, has not confirmed this assertion. He likewise takes notice of the insufficiency of zinc as a remedy in the disease. From the tabular statements which he has given, as well as from the general purport of his paper, I may with certainty affirm, that intermittent fever had prevailed to a less extent in the regiment, during its former, than during its recent services in Upper Canada. "It is a well-known fact," observes Dr. Rush, "that intermittent and bilious fevers have increased in Pensylvania, in proportion as the country has been cleared of wood. It is equally certain, that these fevers have lessened, or disappeared, in proportion as the country has been cultivated." In the account of the wounded, I shall advert to the efficacy of those different medicines which were employed in the cure of the autumnal intermittent fever.

Rheumatism and pneumonia made their appearance at the beginning of winter; but were less frequent than in spring, and resisted in a less obstinate manner, the usual

mode of treatment. When the frost commenced, an immediate check was often given to intermittent fevers of long standing. During winter the hospitals were occupied by a few cases of general debility, of obstructed viscera, and of protracted diarrhœas. These affections were all consequent to former diseases.

Ophthalmia, though met with at times in every season of the year, was most prevalent during winter. It sometimes owed its origin to contagion; but, for the most part, to the severity of the north winds, and to the bright reflection of the sun's rays from the surface of the snow. Ophthalmic patients suffered much on a route, from their unavoidable exposure to cold. The division of the temporal artery, on the invasion of the disease, almost always gave an immediate check to the progress of inflammation. In those men whose eyes had been much weakened by the disease, relapses were of frequent occurrence. In ophthalmia as well as in pneumonia, it was sometimes requisite to

carry blood-letting to a great length. The disease has always been more or less prevalent in my regiment since its services in Egypt, notwithstanding every precaution has been taken to prevent its propagation.

The external parts of the body were liable to be affected by the frost. The nose, cheeks, and ears, suffered more severely than any other part. A person whose face is frost-bitten has a very uncommon appearance. The lips are deprived of their red colour, the nose and cheeks become pale, and seem more pointed than natural. Every feature except the eye, loses its expression of life. In this state the individual is not conscious of the injury he has sustained, till apprised of it by his friends; nor even then is he inclined to place an implicit confidence in their assertion. The dead part, when pressed by his fingers, communicates to them a peculiar sensation, similar to that which is imparted by other dead portions of matter, not connected with fabric of the body. Men who were in a state of intoxication, perished in a

few instances from the severity of the winter's cold. In such, these local effects of the frost were the first steps to exanimation. The powers of muscular motion were next impaired; a state of sleepiness was induced; the senses became annihilated. The vital energy of the system, thus overcome, resisted every means of resuscitation.

Friction with snow, or ice-cold water, was the most effectual remedy for restoring life to a frozen part. The circulation in those parts which had been injured by frost, was afterwards rendered weak and languid, and liable to be interrupted in future, even by a slight exposure to cold. Parts whose vitality had been much injured, were prone to be attacked with indolent ulcerations, the cure of which, even under stimulating applications, was difficult to be accomplished.

V. The active services of the troops were continued for a period of nearly three years. The campaign of 1814, which preceded the ratification of peace in the following spring,

was rendered important by the successful achievements of the army. Being stationed at York in charge of the general hospital during the greater part of that year's campaign, a favourable opportunity was afforded me of witnessing the state of the sick and wounded who were sent thither from the army. That part of the province, I may observe, which stretches from Fort George to Fort Erie was the principal field of active operation. After the several actions which were fought in that tract of the country, the wounded were immediately conducted to the rear as far as Fort George, from whence they were shipped on board small vessels, conveyed across the western extremity of Lake Ontario, to be landed at York, and admitted into hospital. On the evening of the second or third day after an action, they generally reached their place of destination. After the battle of Chippawa, which took place on the 5th of July, a considerable number of wounded were disembarked at York, and admitted into hospital. Sufficient accommodation being af-

forded them, the routine of medical duty had not as yet met with any obstruction. The battle of Lundey's Lane, which was fought on the 17th of the same month, being more sanguinary than that of Chippawa, filled the general hospital at York, and its adjacent buildings, with its numerous wounded. After the latter period, the duty of the medical department, not only at York, but along the Niagara frontier, became serious and laborious. The skirmishes and casual engagements which occurred during the remainder of the campaign, kept the hospitals more or less filled with wounded till the beginning of winter, when the enemy, evacuating Fort Erie, passed over the river Niagara to the peaceful possession of his own territory. Our troops, though opposed to a force much greater in number, generally maintained their ground; and in almost every rencounter had the scale of victory on their side *.

* The number of regular troops in the Upper Province did not exceed 3500. The American force was always more than double that number.

The task, however, is not mine, either to applaud the well-conducted enterprises of an army, or to censure those precipitated measures, which, in their fatal consequences, often obscure the brightest prospects of success.

The general hospital at York, though a commodious building, was deficient in size for the accommodation of the sick and wounded. Its apartments being originally intended for family use, were too small for the wards of an hospital, and did not admit of a free ventilation. Neither were the adjoining houses of the hospital, which were fitted up for temporary accommodation, any way suitable for the reception of the wounded. When, in the course of the summer, the wounded became so numerous as not to be contained within the general hospital and its outhouses, the church, a large and well-ventilated building, was dismantled of its seats, and, for the time being, converted into an hospital. Having made these preliminary remarks, I shall now proceed to give an ac-

count of the state of the wounded, which is to be understood as referring solely to the campaign of 1814, by far the most important epoch of the war in Upper Canada.

Many of the wounded were debilitated from severe service, and had also suffered from the endemic diseases of the country. Their constitutions were not, therefore, in a state well adapted to make reparation for the loss of substance, occasioned by serious injuries. Neither were they in a favourable condition to undergo those formidable operations which are too often the last resort of surgical interference. The sultry season of the year, and the confined apartments of an ill-ventilated hospital, militated much against the recovery of the wounded. These untoward circumstances did not fail to excite many painful apprehensions in the minds of those who felt anxious for the welfare of the soldier.

The constitutional fever attendant on severe injuries, was evidently modified by the influence of climate. It partook of a remit-

tent character, its period of attack depending on the early or late appearance of local inflammation. In a few instances, the remissions of the fever could be traced; but, for the most part, they could not be distinguished. Exacerbations often came on without any previous abatement of fever. Such, indeed, constituted the highest grade of the symptomatic fever. Sometimes the exacerbations were evidently connected with an irritable state of the constitution. At other times they seemed referable to the extent and violence of the inflammation, occupying the peculiar structure of that part which had undergone the solution of its continuity. A high state of constitutional fever, deriving its existence from the presence of inflammation, is not to be regarded in a secondary point of view. It is universally allowed to have much influence on the pain, heat, and swelling of an injured part. To lessen the violence of its symptoms by a general antiphlogistic treatment ought, therefore, to be one of the principal objects of the surgeon.

While his art is employed to subdue the febrile excitement in the system, he may not only check the process of inflammation, but may at times prevent the invasion of a fatal gangrene.

The symptomatic fever which accompanied wounds in the large joints, was often long continued and serious in its consequences. Such injuries, though apparently slight, sometimes put on a most alarming appearance. The pain was great, the surrounding parts became tense and tumefied. The coagulable lymph which was diffused through the cellular texture of the limb, and extending far above the circular border of articular inflammation, with the deposition of osseous matter, both in the joint and in the contiguous muscles, may be considered as the effect of a high and deranged state of arterial action.

In some of the wounded, when the constitutional fever had ceased to operate as a source of general irritation to the system, an attack of intermittent fever prevented recovery. This fever proved fatal to a great

number of the wounded in hospital. In some of the wounded, before death, its paroxysms were so slight in their accession, that they could not be distinguished from those which occur in hectic fever. A colliquative diarrhœa, alternating with intermittent fever, was at times the forerunner of a fatal termination.

This fever undermined the powers of the constitution. Its effects on injuries, even of a trivial nature, were serious and alarming. The process of granulation was interrupted. The matter discharged from a wounded part, became copious, sanious, and bloody. During the intervals of fever, a slight livid discoloration might be observed around the smooth or ragged edges of an injured surface. The surrounding integuments looked shrivelled, and felt flaccid to the touch. The lips of a lacerated wound were either retracted on account of their adhesions being destroyed, or they appeared flat and compressed from the absorption of internal granulation.

There is perhaps no situation in which a

medical practitioner can be placed, more painful to his feelings than that which affords him an opportunity of witnessing the effects of an obstinate intermittent fever spreading its ravages amongst the wounded. Cinchona, which had before been successful as a remedy in this disease, now seemed to lose its beneficial influence. In many of the men, the stomach had become so irritable from its frequent use, that it could not be given in that quantity which was adequate to overcome the fever. Thus, its long-continued administration rather tended to debilitate than to support the strength of a patient. As bark, in its different forms of preparation, had ultimately failed in the cure of the disease, it then became a desirable object to have recourse to the exhibition of other tonic medicines. Zinc was accordingly given in the form of pill; but in no obstinate form of the fever did it either lessen the severity of the paroxysms, or suspend their usual period of accession. Charcoal in powder was next employed, as recommended by Dr. Calcagno of Palermo.

To a number of patients, a scruple of this medicine was given for a dose three times a-day; but that quantity being found ineffectual, a table-spoonful was administered every four hours, without any better success resulting from the prescription of so large a portion. It proved serviceable as a remedy only in a few cases which were not of long standing. Fowler's solution of arsenic was found more effectual in the cure of this fever than any other medicine. Before it was administered, the stomach was emptied by an emetic, and the *primæ viæ* by a gentle aperient. Four drops of the solution were at first given three times a day, and the dose afterwards increased as it was found necessary. In the course of four or five days, many of the most obstinate cases of the disease began to yield to this preparation of the medicine. The arsenical solution, however, though in some instances given in conjunction with opium, could not be continued with safety on account of the irritable state of the stomach and bowels. It was therefore not proper to

employ it indiscriminately in every case of the disease. Much caution was requisite to be observed in its administration. When given before breakfast, is was apt, in some patients, to produce uneasiness in the stomach, and griping in the bowels. Its specific effects on the constitution were always to be watched with much circumspection. The itching of the tarsi, the tenderness of the mouth, and the salivation which sometimes came on, contra-indicated in some individuals its farther use. Convalescents from fever, to whom arsenic had been given, were more subject to relapses than those who had been cured by cinchona. It was, therefore, requisite, during the state of recovery, to give from time to time small doses of the solution. The good effects of this treatment were very observable amongst the men in hospital. While their wounds put on a favourable appearance, they were less disposed to relapse into fever.

Many of the settlers in Upper Canada have nostrums for the cure of intermittent

fever. These are for the most part composed of bitter vegetable infusions and ardent spirits, to which are added Cayenne pepper, nutmeg, and other aromatic stimulants. They are exhibited in small quantities, and at short intervals, before the cold fit is expected. Their operation, as far as I have observed, is always of a violent kind. They are productive of much sickness at stomach, heat of skin, and ultimately throw the patient into a profuse perspiration, which often continues for the space of thirty-six hours. In this manner he becomes exempted, for a few days, from a return of his ague. The debility, however, which follows the operation of such mixtures, is often serious in its consequences. The constitution of the patient now appears to be more immediately under the influence of those causes which at first occasioned the fever. He again relapses into his complaint, which is not only more aggravated in its paroxysms, but more deeply rooted in the system. Such medicines no doubt have been found useful, when taken

early in the disease, but, in cases of long continuance, they have certainly hastened the period of dissolution.

During the warm months of summer and autumn, swarms of flies are often found in those situations where putrefaction is going on. To such insects, an hospital, crowded with wounded, always becomes a desirable place of retreat. They come forth in immense multitudes, either impelled by hunger, or by the instinctive impulse of their nature to propagate their species amongst those putrid substances upon which they live. That state of the air which favours the decomposition of animal matter, seems, in a wonderful manner, to promote their rapid generation. When the earth had been refreshed by warm showers of rain, and again heated by the sun; when the winds were still, and the day or night felt close and oppressive, the succulent maggot appeared more immediately to be called into being. At such a period I have found numbers of them in the extremity of a stump, within the short space

of twenty-four hours after the performance of amputation. The fly, in this state of its existence, proved a source of much misery to the wounded*. When maggots were found in a wound, the matter discharged became fetid and offensive. As they were employed entirely in feeding, they often destroyed a considerable portion of the muscular substance of the part in which they had been brought forth†. In cases of amputation, when they extended their course far into the muscular substance and cellular texture of the limb, they were the cause, not only of much local irritation, but of much constitutional fever. They consumed parts which were necessary to form a new bond of union. As a means of destroying them, spirits diluted with water, were injected into those situations which they occupied. Ve-

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* See Edinburgh Medical and Surgical Journal, No. LI. Art. v. Case of wounded Bladder, by J. Douglas.

† The musca vomitoria (flesh-fly) is said to lay 20,000 eggs. The larvæ of three of these flies will consume the carcass of a horse as soon as a lion. For a classification of larvæ, by Bergman, see Insecto-Theology, page 339.

getable and mineral acids were also found useful in their extermination. But, as they often lay concealed from the eye, in the deep sinuosities which they had formed, injections were not always successful in completing their destruction. From such places it was found necessary to effect their extraction with a probe. The ablution of a stump, or of a wound, with vinegar and cold water, was an excellent means of preventing their recurrence.

Those men who underwent the operation of amputation immediately after action, had usually a fortunate recovery. Though conducted in waggons to a considerable distance in the rear, and crowded with other wounded on board ship, no fatal consequences supervened to the fatigues of their passage. But those men, on the contrary, whose limbs were amputated at York, at an after period, were placed under more inauspicious circumstances. Some of them had been subjected to much pain during the tedious gradations of their journey. Many of them at

the moment of amputation were debilitated, either from the copious discharge of matter from their wounds, or from the previous existence of a high state of constitutional fever. The appearance of hectic fever, with its nocturnal sweats and colliquative diarrhœa, rendered some men unfit to support amputation. Hæmorrhages which threatened life, and which art could no longer restrain, sometimes called for the immediate removal of an injured member. In many unfortunate instances, an accession of intermittent fever superseded the necessity of having recourse to amputation. All these untoward circumstances tended to convince the surgeon how dangerous it was in a number of cases to postpone amputation, even for a short time after the infliction of a severe injury. They taught him, that in a country, where the wounded are liable to be attacked by those diseases which are endemic to the soil, and to suffer from the impure air of a crowded hospital, there are certain kinds of injuries which it would be improper to trust to the

fortuitous efforts of nature, and that, should he allow the first seasonable period of amputation to pass away, he would ultimately witness with painful accusation, the fatal consequences of his ill-timed humanity.

The heat of summer was injurious to the well-doing of amputation. By quickening the constitutional fever into a high degree of action, it prevented, in some measure, the process of adhesion. The boundaries of local inflammation were extended. The suppurating surface of a stump became large, the matter plentiful, and ill-conditioned. It was therefore requisite to remove the superficial dressings in the evening of the second, or on the morning of the third day, after amputation had been performed. This being done, the patient felt relieved from the pressure caused by the bandages, and by the bloody ichor which had been effused in the extremity of the stump. On such occasions the cold lotion which was sometimes applied to the seat of inflammation, was effectual in reducing the limb to an equable temperature.

Though many unforeseen events may take place in the treatment of amputations, and which indeed may thwart the designs of the surgeon, notwithstanding his most cautious circumspection; yet it must be generally acknowledged that a moderate and uniform state of atmospheric temperature is most conducive to the recovery of such operations. Mr. Griffiths, who had charge of the wounded at Fort Wellington, after the action at Ogdensburgh, in the spring of 1813, makes the following remark with regard to amputation: "The piercing cold of winter was unfavourable to the recovery of those men upon whom I performed amputation. Every medical comfort, appropriate for the state of the wounded, was afforded me; but the hospital accommodation was certainly unfriendly to their general welfare. I found much difficulty in keeping up a uniform temperature in the apartments of the sick. The want of a thermometer was an unfortunate occurrence. The stoves by which the rooms were heated, were not supplied so regularly with

fuel during the day or night as I could have wished. To the extremes of heat and cold I therefore attributed the protracted recovery of many of my patients; and were I again to be placed under similar circumstances, I think I should regulate matters with more advantage to the wounded, and with more satisfaction to myself."

In cases of amputation, the divided muscles of a limb are sometimes prone to an unusual degree of retraction. A long and tedious transportation, immediately after the performance of the operation, the occurrence of secondary hæmorrhage for which the dressings have been removed in order to secure the bleeding vessel, the presence of intermittent fever, and the careless application of the bandages at the subsequent dressings, may all have a tendency to produce it. Maggots, too, when allowed to remain in a stump, seem to operate as an immediate exciting cause to this involuntary action. Nor can it be denied that the presence of a number of ligatures in the living soft parts,

which have included both nerves and blood-vessels at the moment of their application, so as to become a source of local irritation, may also have some share in the production of muscular retraction. It is well known that the irritability of the muscular fibre, which, in fact, constitutes retraction, may act so far independent of the nerves as not to be connected with the consciousness of feeling, and that, even in the dead body, it may exist for a considerable time, till at last the organization begins to be dissolved. But it must likewise be confessed, that its inordinate state of action is, to a certain extent, influenced by nervous excitement; for it appears to be increased by the stimulus of inflammation in the extremity of a divided nerve, and accordingly resembles that state of local inflammation which, in its turn, is considerably aggravated by a high grade of symptomatic fever.

By a proper and timely attention to the bandaging of a limb, the retraction of the muscles may often be prevented. The soft

parts should be gently extended, while the circular roller is applied with a moderate degree of tightness, so as not to impede the circulation in the extreme vessels of the stump. When the pressure of the bandage is too great, secondary hæmorrhage may take place, shortly after the performance of the operation. Attention should be paid at each future dressing, that no matter may lodge in those parts where union has not yet been completed. In the after-treatment of those cases of amputation, in which too small a portion of muscular substance had at first been reserved to cover the extremity of bone, other unfortunate consequences are to be dreaded from the injudicious application of the circular roller. Hæmorrhage, inflammation, and a feeling of tension in the limb, which might, at a former period, have been the result of an inordinate degree of pressure, will not now be occasioned; but, in their place may be produced the gradual consumption of the muscles by interstitial absorption. The bone may likewise protrude

from the end of the stump; and the surgeon, attributing these unfortunate occurrences to an unusual retraction of the muscles, is daily led to stretch the soft parts more and more downwards, and to circulate the bandage round the limb with a greater degree of tightness, by which means he increases an evil which he intended to counteract. To effect that degree of pressure by the application of a roller, so as to facilitate, but not to prevent, the union of vital parts, ought, therefore, to be a grand object of a surgeon.

Hospital gangrene made its appearance only in two instances. The subjects of its attack were debilitated in constitution, and had passed the middle period of life. In one patient, it supervened to amputation below the knee, and ultimately proved fatal. In the other patient, it invaded the gastrocnemii muscles, which had been severely lacerated by a canister shot, immediately above the *tendo Achillis;* and to preserve life, amputation above the knee was carried into effect. The man survived the operation, and had

a tedious recovery. This disease was not marked by any uncommon degree of rapidity, nor was it so malignant in its nature as to infect the sores of the other wounded in hospital. It was neither accompanied by fever, nor by local inflammation. A fetid ichor was discharged from those parts over which it spread. At first the granulations were interspersed with ash-coloured spots, which afterwards assumed a black appearance, but did not enter into a state of superficial incrustation. In the patient who died, the consumptive progress of the disease was accompanied with a black putrid exudation, not unlike to dissolved blood. The internal administration of tonic medicines, with the external use of antiseptic applications, appeared to have no influence in checking its slow but fatal progress.

No cases of tetanus came under my notice; nor did I ever hear of the occurrence of this disease amongst the wounded in Upper Canada.

The wounded who were admitted into the

church hospital, had all the advantages of a free ventilation. This building became extremely serviceable to the recovery of those men whose injuries were of a serious kind. From the pure air which the sick and wounded enjoyed in it, their progress to a state of convalescence was often rapid. Men whose wounds put on an unpromising aspect in the general hospital, were at times transferred to this establishment. Intermittent fever, however, with all its fatality, prevailed in the latter, as well as in the former building.

VI. The provincial militia were generally healthy, when employed on active duty, and were more exempted from sickness than the British troops. Their services, though severe, were not always long continued. Some corps being embodied during the war, were constantly employed, either in the field, or in garrison duty; others being called out only on particular emergencies, often enjoyed through winter the tranquillity of their homes.

The inhabitants of the province usually enjoy a good state of health. Some of them are robust and athletic, and well calculated to support the fatigues of war and the labours of husbandry. In childhood, however, they are subject to ague; and it is even common in sickly seasons, to observe infants at their mothers' breasts trembling in a fit of the disease. As they grow up to manhood, their constitutions become naturalized to the climate; and except when they reside in unhealthy situations, they seldom relapse into fever. Emigrants who rear their huts in low wet grounds, often suffer much in their families from sickness, during the first few years of their settlement. In Canada, as in other countries, there are elevated situations to be found, in which the air is pure and salubrious, whose inhabitants, neither in youth nor in age, have ever been indisposed by those diseases which at times predominate in the surrounding districts. Many of the old settlers, though living in places which are productive of disease, and

who, after their arrival in the country, had been annually seized with obstinate agues, may now be seen, even at an advanced period of life, actively employed with their numerous offspring in the cultivation of their farms.

VI. It is not my intention to descend into minute particulars concerning the Indians of Upper Canada. I shall neither designate each nation by its appropriate appellation, nor delineate those peculiarities of character by which the individuals of one nation may be distinguished from those of another.

To observe a number of different Indian tribes, headed by their respective chiefs, and assembled together from the most remote parts of the province, to co-operate with a regular army in the defence of their territories, is certainly a new and entertaining sight. The Indians of Upper Canada bear a striking resemblance to those who inhabit the other parts of North America, nay even to

those who are scattered over the great southern division of the new continent. Should we exclude the Esquimaux people from the account, and a few other individuals who are found in the central parts of the continent, so great is the similitude that exists amongst the numerous tribes, that, though differing remarkably from each other in language, we are induced to conclude, that they are all sprung from the same common stock. The individuals of each nation vary but little in stature and the symmetry of their bodies. Their limbs are muscular and well made. In a state of progression, however, their toes are inclined inwards, and their knees bent a little outwards. Their skin, which is extremely thick, is of a brown or copper colour, and has a shining appearance, from the vegetable juices and greasy pigments with which they stain and besmear their bodies. Their faces are for the most part round; sometimes, however, they are found approaching to an oval shape. Their frontal bones have little or no projection,

and the facial line is perhaps more inclined, but straighter, than that of any other savage nation. The cheek-bones are elevated, but their angles are rather rounded than pointed. Their eyes are small, of a dark colour, and are able to distinguish objects at a great distance. The internal *canthi,* which are turned a little upwards, give to the face an expression of obliquity. Their chins are seldom or never covered with a beard. The hair of their head is black, lank, and has a glossy look, as if kept in a state of constant moisture. Their noses are often flat, their lips are thick, their teeth white and regularly disposed. Their pulse seldom exceeds 62 strokes in a minute; and corresponding to this slowness of the circulation, there is a want of vivacity in their countenance, the usual expression of which is sullen and melancholic. Upon an attentive examination of the face, the individuals of a particular tribe may be distinguished by an accurate observer. There is, therefore, a peculiar

association of feature assignable to a tribe, by which its members may be pointed out.

There is reason to believe, that the heat of the sun is not the only cause to which the diversity of colour in our species may be attributed; for, when we cast our eyes over the wide regions of the old continent, and observe the variety of complexion among men, not only in different, but in the same parallels of latitude, we may with certainty conclude that this great operating cause must be assisted by others of an inferior and less powerful nature. But, further;—were the rays of the sun adequate to produce so wonderful an effect, we should expect to find among the nations of the new continent, as we travelled from the temperate to the equatorial regions, a gradual assimilation of complexion, deepening as it were in proportion to the ascending ranges of atmospheric temperature. But what reasonings can be deduced from the association of a number of other circumstances, which we know to exist, but which we cannot well point out, and

which, in conjunction with the sun, we suppose sufficient to modify the diversity of colour among different nations? Even taking into account the geographical position of a country, the elevation of its peopled districts above the level of the ocean, the soil and productions, with those habits of life which may have long characterized its inhabitants as a separate or individual people, how are we to reconcile the colour of the *Negro* with the milky whiteness of those people termed *Albinos*, whose complexions, almost from the moment of birth, remain alike unchanged amid the sultriness of the climate? This branch of physiological science, how interesting soever it may be as connected with the history of human beings, is as yet involved in much doubt and obscurity. The many difficulties, indeed, which we have to surmount in attempting its elucidation, are almost sufficient to discourage the pursuit of our inquiries.

Each Indian nation preserves in its own territory a savage state of independent li-

berty. Civilization has as yet made little progress amongst the greater number of the nations. Their intellectual powers may therefore be regarded as in a state of infancy. Because their stock of ideas has not been increased by education, their curiosity appears inactive. Hence, objects, in themselves interesting, are regarded with an unaccountable air of indifference. From their reasoning faculties not being exercised, they are unaccustomed to reflection. Improvident of futurity, they consider indolence and liberty as the chief enjoyments of their being. In their colloquial intercourse, their words are few, and the same word is often applied to a number of different objects. Their language, however, is bold and figurative, and their speech is accompanied with a variety of gesticulations, evidently introduced to facilitate the expression of their ideas.

The principal occupations of the Indians are war, hunting, and fishing. Few individuals of any of the tribes obtain their support by cultivating the soil. Hence, an In-

dian is not often to be seen in the cultivated parts of the province, which always prove inhospitable to the pursuits of the chase. By forsaking the settlements of his new neighbours, and retiring into his remote and trackless deserts, he is thus supplied with a more easy means of subsistence.

In time of war, each nation is headed by its own chief, who may be said to possess only a nominal authority. He issues no orders; he enforces obedience from none of his subjects. Power, therefore, is usurped by no individual of a tribe. While every person claims an equal share of property, ambition has no room to operate. With a sentiment of equality in his breast, and conscious of his own importance, every warrior goes forth to battle to obtain victory and glory. His associates in arms he regards as his brothers, or as his friends; and in the prosecution of every warlike enterprise, he considers his own exertions as subservient to the welfare of the community in which he lives. Proud of his independence, he spurns at the idea of sub-

mission, and considers himself as inferior to none in arms, or in courage.

The manners of the Indians are solemn and reserved, and destitute of that gaiety which is observed amongst a civilized people. Their songs and dances, which are often symbolical of their transactions in life, excite sensations of horror and melancholy in the breast of a spectator. In doing, or in suffering, an Indian cannot be charged with those weaknesses which are incidental to humanity. An indulgence in love he regards as the height of effeminacy. Under privation, or bodily torment, he is patient and composed. Though his desire for food be great, he will not complain of hunger. As he has no fixed period for repast, he satisfies his appetite only when urged by the gentle or imperious calls of nature. When led into captivity by his enemies, his courage never forsakes him; and, even in the moment of trial, he upbraids their want of ingenuity in inflicting torture. In time of war he is active and vigilant; and if in pursuit of his

enemies, he consumes but little of his time in rest or in sleep. When he examines the bark of the trees, and the inclination of their trunks and branches to the east, or the manner in which their leaves are strewn upon the ground by the winds of autumn, he can find out, with great exactness, the cardinal points of the heavens. With a scanty means of subsistence he is able to travel to an incredible distance, and can guide his footsteps with the most wonderful precision through every untrodden part of his boundless deserts.

Before the Indians have attained an advanced period of life, the marks of old age appear on the countenance. This is caused, not only by the severe fatigues and privations to which they are often exposed, but by the habitual indolence to which they are prone, when supplied with plenty of provisions.

The Indian women, like those of many other savage nations, participate in the misfortunes of a cruel servitude. In their ordinary transactions of life, they show more vivacity than the men. Their features are

often regular and expressive. Some individuals amongst them have pretensions even to a considerable share of beauty. They are seldom given in marriage before they have attained the twentieth year of their age. Their bodily strength, however, soon becomes impaired under the pressure of those toils to which they are subjected by their husbands. Hence, that exercise which, under judicious appropriation, might invigorate the powers of the constitution, impairs, from its long continuance, the very principle of action.

Their children, though healthy, are few in number. This circumstance can be referred to no other cause than to the degraded state in which their mothers live, accompanied, in many of the tribes, with an extreme scarcity of provisions. In the latter months of pregnancy, the female is exempted from those arduous occupations which have a tendency to induce premature labour. When the hour of travail approaches, she retires, often unattended, to a hut, from which,

after three or four days' confinement, she returns again to her usual employment.

The food of the Indians, though differently prepared from that of civilized nations, is composed both of animal and vegetable matter. They appear remarkably fond of the numerous kinds of wild fruit, with which their forests in many parts abound. The roots and leaves of various plants, made into soup, form a part of their aliment. After many hours spent in eating, to which they are often disposed on account of their long fastings, they are at times observed to dry the flesh of the wild deer, by exposing it, when cut into small pieces, to the rays of the sun. To reserve it for future use, they in like manner expose it during winter to the action of the frost. The Indians, however, are in general so careless of the future, that they seldom resort to such measures as these, in order to provide against the contingencies of hunger. The customs and manners of the Indians have often excited the admiration of travellers; and have furnished

matter, both for the historian and poet. Some men, indeed, regarding the Indian simplicity of life as essential to happiness, have left the refinements of civilized society, and retiring into the woods, have assumed the manners, and adopted the customs, of a particular nation. How captivating soever that simplicity may appear, either when dressed in the imposing language of history, or associated with the most beautiful images in poetry, it can have few attractions to that man, whose mind, guided by the principles of a sounder philosophy, has been led to form a different estimate of human happiness*.

The Indians are strangers to a number of those diseases which are incident to man in a polished state of life. The manner in which they are treated in youth, and the nature of those hardships to which they are exposed in manhood, have certainly some share in ren-

* For further particulars concerning the Indian Nations in Upper Canada, see Mackenzie's Voyages in North America, Carver's Travels, and Charlevoix's History of Upper Canada.

dering their bodies able to resist the causes of disease. Their children suffer little or nothing from sickness during the period of dentition. After birth they are daily immersed in cold water, that their bodies may be early accustomed to support the vicissitudes of heat and cold, from which they suppose a number of their diseases to originate. They are also swathed to a board for several months, upon which they sleep more frequently in the erect, than in the recumbent posture. From this mode of treatment is derived the peculiar shape of their lower extremities, which I have already mentioned. This board is employed by every female of the North American Indians in the rearing of her offspring, and seems to have been originally intended to facilitate their removal from one place to another. For eighteen months after birth, every child is supported solely by its mother's milk, no other food being administered till it is provided with teeth to masticate a more nutritious aliment. Parents, to

make trial of the courage and patience of their male children, have at times been known to sear their bodies with a red-hot iron, or to expose them, when naked, to the flames of a slow consuming fire.

Remittent and intermittent fevers are to be met with amongst the Indians. The latter disease is confined chiefly to the time of infancy, adults almost never suffering from its attacks. It is, therefore, probable that the greasy substances with which they are accustomed to anoint their skins, may tend in some measure to protect their bodies against the effluvia of the marshes. Acute inflammations sometimes seize the internal parts of their frame. Such affections when seated in the lungs or intestines often prove fatal to the Indians.

Variola is reported by travellers to have been extremely destructive to the *aborigines* of the new continent. Some individuals amongst them bear on their skins the marks of this disease. The inflammatory symptoms of this wasteful distemper are highly

aggravated in the Indian constitution. The process of suppuration appears to be greatly impeded by the extreme thickness of the *cutis vera*, and the matter when formed, being deeply seated, is discharged with considerable difficulty from the surface of the pustules.

It was rumoured at one time, that the venereal disease had spread extensively amongst the Indians. No cases of syphilis, however, either in its primary or secondary form, ever came under my notice. The disease made its appearance only in a few instances amongst the troops, and from this circumstance the report seemed to originate. It is asserted by some who have lived and travelled in the interior parts of the country, that many of the Indian nations have a knowledge of certain plants, whose efficacy they deem infallible in the cure of every form of syphilis. An interpreter of the Souk nation, with whom I have conversed, not only corroborates this statement, but affirms, that he has seldom

known the disease prove fatal to any of the Indians.

Pulmonary consumption has never been observed in any individual amongst the Indians; nay, it is even doubtful whether mania, apoplexy, hypochondriasis, and gout, should be classed among those diseases to which they are subject.

Venæsection is resorted to by the Indians in the treatment of severe attacks of fever. Sharp pieces of flint, or wood, are the instruments with which they perform the operation. They are also acquainted with the use of purgatives, emetics, sudorifics, and blisters; but such medicines are usually intrusted to the care of their diviners, who in serious cases of disease act the part of physicians.

The mythology of the Indians is wild and inconsistent. As they believe in the existence of certain spirits upon whom they suppose their happiness or misery to depend, it is not to be wondered at, that some individuals among them should have pretensions to a knowledge of the future, should

employ spells and incantations, or have recourse to a variety of mysterious rites, in order to impose on the credulity of their weaker brethren. Thus deluded by divination, they are taught to believe that certain substances, worn on particular parts of their bodies, have the power not only of averting disease, but of protecting them against every evil of a destructive nature. In every rude and uninformed nation, we may always observe a wonderful connexion between medicine and superstition. A stranger who interferes with the concerns of a savage, is often regarded with an eye of suspicion. No means we can employ are sufficient to persuade him to disclose the secrets of his nation. An insurmountable barrier is therefore opposed to our inquiries concerning those remedies which the rude tribes of North America employ in the cure of their diseases*.

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* Much valuable and original information relating to the state of medicine amongst the Indians may be obtained by referring to Rush's Medical Inquiries, vol. i. p. 1.

It was my wish that another pen than mine had consecrated its time to those subjects of which I have attempted to treat. More than two years have elapsed since my arrival from Canada; but no communication relating to the diseases of the army in that country, has as yet been given to the public. To atone for so great an omission, the foregoing pages are presented to the world;—but they are offered with every feeling of apprehension whether they may prove useful.

As the contents of my paper are merely a faithful relation of all that I have witnessed when with the army in Upper Canada, on this account they may be said to resemble a picture which is intended to represent a variety of objects. If I have introduced subjects which are foreign to my proposed arrangements, the fault may be excused by

those who regard no picture as complete which is destitute of its meaner objects. The pathological and surgical divisions, I am well aware, contain many imperfections. By deviating in some measure from the opinions of those whose authority is respected, I may have been led incautiously into error. If such should be the case, let it be remembered, that the boundaries of human knowledge have never been extended by those who have implicitly followed the doctrines of others. If I have advanced any thing whereby the practical ends of medicine or of surgery can be benefited, I shall feel amply compensated that my labours have been so happily bestowed. Even abandoning the hope that the report which I have given may prove useful in a medical point of view, pretensions of an inferior kind may be its desert. As a memorial of what has been done and suffered by the army, it may awaken in the minds of some who read it, an emotion of social interest. Should the Upper Province of Canada again become a field of hostility, it

may forewarn the young medical practitioner of a number of those untoward events which he may be called to encounter in the discharge of his professional duty.

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